AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE J	PAGE OF PAGES 1 ç 32

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. **REQUISITION/PURCHASE REQ. NO.**	5. **PROJECT NO.** *(If applicable)*
0001	13 June 2000		Various CONUS PC&S Locations

6. **ISSUED BY**	**CODE** SCO600	7. ADMINISTERED BY (*If other than Item 6*)	**CODE**
DEFENSE ENERGY SUPPORT CENTER 8725 JOHN J. KINGMAN ROAD, SUITE 4950 FT. BELVIOR, VA, 22060 BUYER/SYMBOL - P. DACEY/DESC-FPB PHONE - (703) 767-9345/FAX: (703) 767-9338 EMAIL: pdacey@desc.dla.mil 6.4			

8. NAME AND ADDRESS OF CONTRACTOR (*NO., street,city,county,State,and ZIP Code*)		9a. **AMENDMENT OF SOLICITATION NO.**
	X	SP0600-00-R-0062
		9b. **DATED** *(SEE ITEM 11)* 9 JUN 00
		10a. **MODIFICATION OF CONTRACT/ORDER NO.**
		10b. **DATED** *(SEE ITEM 13)*

11. **THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers
[ ] is extended, [X] is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning **1** copy of the amendment;(b) By acknowledging receipt of this amendment on each copy of the offer submitted; or(c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers.

FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. **ACCOUNTING AND APPROPRIATIO N DATA** *(If required*

13. **THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b)
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: MUTUAL AGREEMENT OF THE PARTIES
	D. OTHER *(Specify type of modification and authority)*

E. **IMPORTANT:** Contractor [X] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. **DESCRIPTION OF AMENDMENT/MODIFICATION** *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

The above referenced solicitation is hereby changed to add the following information:

(1) The Contract Period will be from 1 February 2001 to 31 January 2002, with three (3) one year options.

(2) Section M – Evaluation Factors for Award is changed to include the filled in info is clause M2.11 and add clause M28.100 as follows:

(Continued on page 2)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. **NAME AND TITLE OF SIGNER** (*Type or print*)		16A. **NAME OF CONTRACTING OFFICER**	
15B. **NAME OF CONTRACTOR/OFFEROR** **BY** _____ *(Signature of person authorized to sign)*	15C.D**ATE SIGNED**	16B. **UNITED STATES OF AMERICA** BY _____ *(Signature of Contracting Officer)*	16C.**DATE SIGNED**

Clause M2.11 is updated to include the filled in information as required.

M2.11 EVALUATION – COMMERCIAL ITEMS (JAN 1999)

(a) The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to this solicitation will be most advantageous to the Government, price and other factors considered. The following factors shall be used to evaluate offers:

(1) Past Performance, and
(2) Price/Cost

For this solicitation, past performance will be equal in importance to price or cost.

(b) **OPTIONS.** The Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. The Government may determine that an offer is unacceptable if the option prices are significantly unbalanced. Evaluation of options shall not obligate the Government to exercise the option(s).

(c) A written notice of award or acceptance of offer, mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer, shall result in a binding contract without further action by either party. Before the offer's specified expiration time, the Government may accept an offer (or part of an offer), whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. (FAR 52.212-2)

M28.100 is hereby added to the solicitation.

M28.100 EVALUATION OF OFFERS (DESC JUN 1995)

(a) Award of this contract shall be made by using source selection procedures. Proposals submitted in response to this solicitation will be evaluated by a board of one or more Government personnel, with selection of the Contractor made on the basis of an overall assessment of each offeror's ability to satisfy the requirements of the solicitation. This overall assessment will include evaluation of general considerations as well as the result of the evaluation of past performance and price, recognizing that subjective judgment on the part of the Government evaluator(s) is implicit in the entire source selection process. Examples of general considerations include proposed contractual terms and conditions and results of a preaward survey. The Government reserves the right to award to other than the lowest evaluated offeror. The SSA will make a determination of the overall merit of each proposal in terms of its potential to satisfy the needs of the Government.

(b) For this solicitation, past performance will be equal in importance to cost or price. Proposals will be rated and ranked against the evaluation factor listed below:

PAST PERFORMANCE

The Government will evaluate the quality of the offeror's past performance. This may include any aspect of past performance that is related to this contract. The assessment of the offeror's past performance will be used as one means of evaluating the credibility of the offeror's operational capability. A record of marginal or unacceptable past performance may be considered an indication that the promises made by the offeror are less than reliable. Such an indication may be reflected by DESC's overall assessment of the offeror's proposal. However, a record of acceptable (or even excellent) past performance will not result in a favorable assessment of an otherwise unacceptable proposal.

In investigating an offeror's past performance, the Government will consider information in the offeror's proposal and information obtained from other sources, including past and present customers and their employees, other subcontractors, and any others who may have useful information.

If an offer has no relevant past performance experience, the offer with be given an acceptable rating.

(c) PROPOSAL EVALUATION**.** After evaluation, past performance will be given one of the following ratings:

(1) Exceptional.
(2) Acceptable.
(3) Marginal.
(4) Unsatisfactory.

Differentiation may be made between proposals rated in the same category.

PRICE will be evaluated as follows:

Each location will be evaluated individually for price. The total price for a location will be calculated by summing the subtotals for that location. Each subtotal corresponds to a product. Subtotals are calculated as follows:

Each location will be evaluated individually for price. The total price for a location will be calculated by summing the subtotals for that location. Each subtotal corresponds to a product. Subtotals are calculated as follows:

a) For each series, the price per series will be multiplied by the corresponding estimated number of samples per year.

b) For individual tests, the prices for one each of the individual tests are summed.

c) The totals for each series in "a" above are added together, along with the sum of the individual test prices ("b" above). The resulting sum represents a subtotal.

Prices for transportation of samples will be evaluated as follows:

For offers in which the proposed laboratory is beyond reasonable driving distance from the sample location, the proposed transportation cost will be multiplied by the estimated number of samples at that location. The resulting total transportation cost will be added to the total testing cost to create a total overall cost for that location.

For offers in which the proposed laboratory is beyond reasonable driving distance from the sample location, the 24-hour turn-around time will include the time required to transport the sample to the lab via courier. For offers in which the proposed laboratory is within reasonable driving distance from the sample location, the 24-hour turn-around time will include the time required for the QSR to transport the sample to the laboratory.

In addition to other factors, offers will be evaluated on the basis of advantages or disadvantages to the Government that might result from making more than one award (multiple awards). It is assumed, for the purpose of evaluating proposals, that $500 would be the administrative cost to the Government for issuing and administering each contract awarded under this solicitation, and individual awards shall be for the items or combinations of items that result in the lowest aggregate cost to the Government, including the assumed administrative costs.

Delete Clause L2.05-7 and replace with the following clause L2.05-7.100:

L2.05-7.100 INSTRUCTIONS TO OFFERORS - COMMERCIAL ITEMS (LAB TESTING) (DESC FEB 2000)

(a) **AMENDMENTS TO SOLICITATIONS.** If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(b) **SUBMISSION, MODIFICATION, AND WITHDRAWAL OF PROPOSALS.**

(1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, signed and date proposals and modifications thereto shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror at or before the exact time specified in this solicitation. Offerors using commercial carriers should ensure that the offer is marked on the outermost wrapper with the information in subdivision (i) and (ii) above. Proposals may be submitted on the SF 1449, letterhead stationery, or as otherwise specified in the solicitation.

(2) The proposal must show—

(i) The solicitation number;

(ii) The name, address, ad telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) **FOR RFPs ONLY.** Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate with the Government on the offeror's behalf in connection with this solicitation; the offeror or quoter represents that the following persons are authorized to negotiate on its behalf with the Government in connection with this request for proposals or quotations:

_____

___

___

(iv) Include name, title, and signature of person authorized to sign the offer. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(v) A technical description of the items being offered in sufficient detail to evaluate compliance with the requirements in the solicitation. This may include product literature, or other documents, if necessary;

(vi) Terms of any express warranty;

(vii) Price and any discount terms;

(viii) "Remit to" address, if different from mailing address; and

(ix) A completed copy of the representations and certifications in the Offeror Submission Package.

(x) If the offer is not submitted on the SF 1449, include a statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation. Proposals that fail to furnish required representations or information, or reject the terms and conditions of the solicitation may be excluded from consideration.

(xi) **PAST PERFORMANCE.**

(1) **EXPERIENCE.** The offeror shall list all contracts and subcontracts (completed or in progress) for the last three years from DESC as well as others (completed or in progress) for other Government agencies or the private sector that are related to the proposed contract. Failure to submit a complete list may reflect adversely on the Contractor. The Government has the option to consider information from these sources, and any others that may be available, that it deems necessary in order to make an accurate assessment of the Contractor's past performance. The offeror should include the following information:

(a) Name of contracting activity;

(b) Contract number;

(c) Contract type and dollar value;

(d) Brief description of the work (if the offeror is a large business, include a description of any subcontracting); and

(e) Contracting Officer, Contracting Officer's Representative, Administrative Contracting Officer, and program manager (all that are applicable) with telephone numbers. These contracts may include efforts undertaken on behalf of (1) private industry, (2) quasi-government organizations, or (3) Federal agencies, including those performed for non-DoD activities.

(2) The offeror should provide information on any significant problems encountered and corrective actions taken. (DESC 52.215-9F95)

(3) **LATE SUBMISSIONS, MODIFICATIONS, REVISIONS, AND WITHDRAWALS OF OFFERS.**

(i) Offerors are responsible for submitting offers, and any modifications, revisions, or withdrawals, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that offers or revisions are due.

(ii) (A) Any offer, modification, revision, or withdrawal of an offer received at the Government office designated in the solicitation after the exact time specified for receipt of offers is **"late"** and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and--

(a) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of offers; or

(b) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(c) If this solicitation is a request for proposals, it was the only proposal received.

(B) However, a late modification of an otherwise successful offer, that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the offer wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that offers cannot be received at the Government office designated for receipt of offers by the exact time specified in the solicitation, and urgent Government
requirements preclude amendment of the solicitation or other notice of an extension of the closing date, the time specified for receipt of offers will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Offers may be withdrawn by written notice received at any time before the exact time set for receipt of offers. Oral offers in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile offers, offers may be withdrawn via facsimile at any time before the exact time set for receipt of offers, subject to the conditions specified in the solicitation concerning facsimile offers. An offer may be withdrawn in person by an offeror or its authorized representative if, before the exact time set for receipt of offers, the identity of the person requesting withdrawal is established and the person signs a receipt for the offer.

(c) **PROPOSAL ACCEPTANCE PERIOD.**

(1) **Acceptance period**, as used in this provision, means the number of calendar days available to the Government for awarding a contract from the date specified in this solicitation for receipt of proposals.

(2) This provision supersedes any language pertaining to the acceptance period that may appear elsewhere in this solicitation.

(3) The Government requires a minimum acceptance period of _120_ calendar days.

(4) If the offeror specifies an acceptance period which is less than that required by the Government, such offer m be rejected.

(5) The offeror agrees to execute all that is has undertaken to do, in compliance with its offer, if such offer is acceptable to the Government and is accepted within the acceptance period stated in paragraph (3) above or within any extension thereof which has been agreed to by the offeror.

(d) **STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE AND SMALL BUSINESS SIZE STANDARD.** The SIC code and small business size standard for this acquisition appear in Block 10 of the solicitation cover sheet (SF 1449). However, the small business size standard for a concern that submits an offer in its own name, but which proposes to furnish an item that it did not itself manufacture, is 500 employees.

(e) **PRODUCT SAMPLES.** When required by the solicitation, product samples shall be submitted at or prior to the time specified for receipt of offers. Unless otherwise specified in this solicitation, these samples shall be submitted at no expense to the Government, and returned at the sender's request and expense, unless they are destroyed during preaward testing.

(f) **MULTIPLE PROPOSALS.** Offerors are encouraged to submit multiple proposals presenting alternative terms and conditions or commercial items for satisfying the requirements of this solicitation. Each proposal submitted will be evaluated separately.

(g) **CONTRACT AWARD.**

(1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract after conducting discussions with offerors whose proposals have been determined to be within the competitive range. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals. Therefore, the offeror's initial proposal should contain the offeror's best terms from a price and technical standpoint. The Government reserves the right not to conduct discussions as determined by the Contracting Officer.

(h) **MULTIPLE AWARDS.** The Government may accept any item or group of items of an offer, unless the offeror qualifies the offer by specific limitations. Unless otherwise provided in the Schedule, offers may be submitted for quantities less than those specified. The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit prices offered, unless the offeror specifies otherwise in the offer.

(i) **AVAILABILITY OF REQUIREMENTS DOCUMENTS CITED IN THE SOLICITATION.**

(1) (i) The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29, and copies of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained for a fee by submitting a request to--

GSA, FEDERAL SUPPLY SERVICE SPECIFICATIONS SECTION
470 EAST L'ENFANT PLAZA, SW, SUITE 8100
WASHINGTON, DC 20407
TELEPHONE: (202) 619-8925
FAX: (202) 619-8978

(ii) If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the address in (i) above. Additional copies will be issued for a fee.

(2) The DOD Index of Sp ecifications and Standards (DoDISS) and documents listed in it may be obtained either through the Defense Standardization Program Internet website at **http://www.dsp.dla.mil** or from the--

DEPARTMENT OF DEFENSE SINGLE STOCK POINT (DODSSP)
BUILDING 4, SECTION D
700 ROBBINS AVENUE
PHILADELPHIA, PA 19111-5094
TELEPHONE: (215) 697-2179
FAX: (215) 697-1462

(i) Automatic distribution may be obtained on a subscription basis.

(ii) Order forms, pricing information, and customer support information may be obtained--

(A) By telephone at (215) 697-2179; or

(B) Through the DoDSSP Internet site at **http://www.dodssp.dla.mil**.

(3) Nongovernment (voluntary) standards must be obtained from the organization responsible for their preparation, publication, or maintenance.

(j) **FACSIMILE PROPOSALS.** (FAR 52.215-5). Incorporated by reference.

(FAR 52.212-1**, tailored**/DESC 52.212-9F28)

(3) THE FOLLOWING ATTACHMENTS 1 THROUGH 7 ARE HEREBY INCORPORATED INTO THE SOLICITATION:

ATTACHMENT 1

CLIN and Location Legend

CLIN POSITION

1 = Contract Year
2 = Space Filler
3&4=Location

SubCLIN POSITION

1 = Contract Year
2 = Service Requirement
3 & 4 =Location
5 & 6 =Product Code

SERVICE REQUIREMENT

A = Full-Specification Product Sample Testing
B = B-1 Series Sample Testing
C = C Series Sample Testing
D = B-2 Series Sample Testing
H = **H**and blending Service. Volumetrically compositing fuel Samples taken from Barge/Tanker, or fuel samples with additives.
I = Individual Characteristic Sample Testing
O = Other
S = Sampling Service of Product Identified at the Facility Identified
T = Transportation Service of Product Sample from the Identified Facility to the Laboratory

PRODUCT CODES

CODE	PRODUCT
01	Jet A/Jet A-1
02	FSII
03	Bottom Water
04	JP-4
05	JP-5
06	F-76
07	O-250 (Lube / 17331)
08	JP-8
09	O-278 (Lube / 9000)
10	DF-1
11	DF-2
12	DF-A
13	DL-1

CODE	PRODUCT
14	DL-2
15	DL-A
16	MUR
17	MUM
18	MUP
19	RFO
20	Hydraulic Fluids
21	Lubricating Oils
22	Greases
23	FS-4
24	MGO
25	MGO (F76 SPEC)
26	COAL

ATTACHMENT 1 (CONT'D)

LOCATION GUIDES

Continental United States (CONUS)

00	One time testing any location CONUS
01	Baton Rouge, LA
02	Homestead, FL
03	Key West, FL
04	Lockhart, MS
05	Montgomery, AL
06	Moundville, AL
07	Moffett Field, CA
08	New York Harbor, NY
09	Selby, CA
10	Pt. Molate, CA
11	Salt Lake City, UT
12	Doraville, Bremen, GA
13	Port Everglades, FL
15	Houston, TX
16	Norwalk, CA

17	San Pedro, CA
18	Drumwright, OK
21	Aledo, TX
22	Baltimore, MD
24	Chicago, IL
25	San Antonio, TX
27	Corapolis, PA
28	Columbus, OH
29	Macon, GA
30	Selma, NC
31	Pratt & Whitney, Palm Beach, FL
32	Boston, MA
33	Portland, ME
34	Alamogordo, NM

Miscellaneous and Outside Continental US (OCONUS)

	MISC LOCATIONS
43	Coal Testing
44	Bunker - Coast Guard
45	Bunker - Navy
46	Bunker - MSC
	OCONUS LOCATIONS
47	Ethiopia IP
48	Senegal IP
49	Ivory Coast IP
51	Dubai, UAE
52	Jebel Ali, UAE
53	Yanbu, SA
54	Ras Tanura, SA
55	Muscat, Oman
56	Bahrain
57	Djbouti
59	Cypress IP
60	Athens, GR
62	Portugal IP
63	Switzerland IP
64	Austria IP
70	Augusta Bay, Sicily
75	Naples, IT
77	Livorno, IT
80	Cagliari, Sardinia

81	Mersin, Turkey
82	Antalya, Turkey
83	Iskenderun, Turkey
84	RIK
85	Adana, Turkey
89	Guam
90	Singapore
91	Hong Kong IP
92	Philippines IP
93	Australia
94	New Zealand IP
95/98	Panama/MGO
96	Greenland
97	Aden, Yemen

ATTACHMENT 2

TURBINE FUEL, AVIATION, GRADES JP-5 NATO F-44

TESTING REQUIREMENTS, MIL-DTL-5624 (Latest Version)

A. Full Specification Testing (A Series), includes all tests listed below (one price for all). Testing shall be performed in accordance with the specified method.

B. Individual Tests are any one, or combination, of tests below (individual prices).

CHARACTERISTIC	TEST METHOD, ASTM
1) Workmanship	**1/**
2) Color, Saybolt	D156 **R/**, D6045
3) Total Acid Number	D3242
4) Aromatics	D1319
5) Sulfur, Total Percent	D1266, D2622, D3120, D4294 **R/,** or D5453
6) Sulfur, Mercaptan	D3227
7) Doctor Test	D4952
8) Distillation **2/**	D86 **R/,** D2887
9) Flash Point **3/**	D56, D93 **R/,** D3828
10) Density, or API Gravity	D1298, D4052 **R/**
11) Freezing Point	D2386 **R/**, D5901, D5972
12) Viscosity at -20°C	D445
13) Heating Value, Net Heat of Combustion	D3338, D4809 **R/**, D4529
14) Hydrogen Content	D3701
15) Smoke Point	D1322
16) Cetane Index, Calculated	D976 **4/**
17) Copper Strip Corrosion	D130
18) Thermal Stability	D3241 **5/**
19) Existent Gum	D381 **6/**
20) Particulate Matter (Solids)	D2276, D5452 **R/, 7/**
21) Filtration Time	**7/ 8/**
22) Combined Test for Particulate Matter and Filtration Time	**11/**
23) Water Reaction, Interface Rating	D1094
24) Micro-separometer Rating **9/**	D3948
25) Fuel Systems Icing Inhibitor	D5006 **10/**
26) Color, Visual	D4176
27) Sulfides in Water	See Statement of Work
28) Copper (CU)	IP225 **12/** (specific locations only)

Attachment 2 (Cont'd)

C. B-1 Series Testing (one price for the following 12 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Lead content (If contaminated with leaded fuels suspected)
11) Water Reaction
12) Fuel Systems Icing Inhibitor

D. B-2 Series Testing (one price for the following 15 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Lead content (If contaminated with leaded fuels suspected)
11) Water Reaction
12) Fuel Systems Icing Inhibitor
13) Thermal Stability
14) Color, Saybolt
15 Total Acid Number

E. Type C Testing (one price for the following 4 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Density or API Gravity
4) Flash Point

NOTES:

R/ Referee Test Method.

1/ Workmanship. Fuel shall be clear and bright and visually free from un-dissolved water, sediment, or suspended matter.

2/ A condenser temperature of 0^{o}C to 4^{o}C (32^{o}F to 40^{o}F) shall be used for distillation by ASTM D86.

3/ ASTM D3828 may give results up to 1.7^{o}C (3^{o}F) below the ASTM D93 results. ASTM D56 may give results up to 1^{o}C (2^{o}F) below the ASTM D93 results.

4/ Mid-boiling temperatures may be obtained by either D86 or D2887 to perform Cetane Index calculation. If D86 values are used, they should be corrected to standard barometric pressure.

5/ See Paragraph 4.4.2.1 for ASTM D3241 test conditions and test limits.

6/ If air is used instead of steam while performing ASTM D381, it must be reported. In case of a failure with air, the sample must be retested using steam.

7/ A minimum sample size of 3.79 liters (one gallon) shall be filtered. Filtration time will be determined in accordance with the procedures in MIL-DTL-5624, Appendix A. The procedure in appendix A may also be used for the determination of particulate matter as an alternate to ASTM D2276 or D5452.

8/ A flow reducer ring is not required for JP-5.

9/ The minimum Micro-Separometer rating using a Micro-Separometer (MSEP) shall be as follows:

Attachment 2 (Cont'd)

Product	Additives	MSEP Rating, Min
JP5	Antioxidant (AO), Metal Deactivator (MDA)	90
JP-5	AO, MDA, and Fuel System Icing Inhibitor (FSII)	85
JP-5	AO, MDA, and Corrosion Inhibitor/Lubricity Improver (CI/LI)	80
JP-5	AO, MDA, CI/LI, and FSII	70

10/ Tests shall be performed with ASTM D5006 using the DiEGME scale of the refractometer.

11/ Filtration Time Procedure:

a. Membrane filters shall be removed from the package and placed in an oven for a minimum of 15 minutes at 90°C. After preheating, but prior to weighing, the membrane filters shall be stored in a desiccator.

b. Each membrane filter shall be weighed. A filter weighing in excess of 90 mg will not be used in the test.

c. Place two membrane filters (test and tare) on the filter base and lock the funnel in place.

d. Immediately prior to filtering the fuel, shake the sample to obtain a homogenous mix and assure that fuel temperature does not exceed 30°C (86°F). Clean the exterior or top portion of the sample container to insure no contaminants are introduced. Any free water present in the fuel sample will invalidate the filtration time results by giving an excessive filtration time rating.

e. With the vacuum off, pour approximately 200 mL of fuel into the funnel.

f. Turn vacuum on and record starting time. Continue filtration of the 3.79 liters (1 gallon) sample, periodically shaking the sample container to maintain a homogenous mix. Record the vacuum in kPa (in. of mercury) 1 minute after start and again immediately prior to completion of filtration. Throughout filtration, maintain a sufficient quantity of fuel in the funnel so the membrane filter is always covered.

g. Report the filtration time in minutes expressed to the nearest whole number. If filtration of the 3.79 liters (1 gallon) is not completed within 30 minutes, the test will be stopped and the volume of the fuel filtered will be measured. In these cases, report filtration time as ">30 minutes" and the total volume of fuel filtered.

h. Report the vacuum in kPa (in. of mercury) as determined from the average of the two readings taken in f above.

Attachment 2 (Cont'd)

i. After recording the filtration time, shut off the vacuum and rinse the sample container with approximately 100 mL of filtered petroleum ether and dispense into the filtration funnel. Turn on the vacuum and filter the 100 mL rinse. Turn off the vacuum and wash the inside of the funnel with approximately 50 mL of filtered petroleum ether. Turn on vacuum and filter. Repeat the funnel rinse with another 50 mL of petroleum ether but allow the rinse to soak the filter for approximately 30 seconds before turning on the vacuum to filter the rinse. With the vacuum on, carefully remove the top funnel and rinse the periphery of the membrane filter by directing a gentle stream of petroleum ether from the solvent dispenser from the edge of the membrane toward the center, taking care not to wash contaminants off the filter. Maintain vacuum after final rinse for a few seconds to remove the excess petroleum ether from the filter.

j. Using forceps, carefully remove the filters from the filter base and place in a clean Petri dishs. Dry in the oven at 90°C (194°F) for 15 minutes with the cover on the Petri dish slightly ajar. Place dish in a dessicator and allow to cool for a minimum of 15 minutes. If more than one sample is processed, cooling time will have to be increased. Reweigh the filter.

k. Report the total solids content in mg/liter by using the following formula:

$$\frac{\text{Weight gain of filter in mgs}}{3.785} = \text{mg/liter}$$

l. Should the sample exceed the 30-minute filtration time and a portion of the fuel is not filtered, the solids content in mg/liter will be filtered as follows: Determine the volume of fuel filtered by subtracting the ml of fuel remaining from 3.785.

$$\frac{\text{Weight gain of filter in mgs}}{\text{ml of fuel filtered X } 0.001} = \text{mg/liter}$$

12/ Metals: Copper will be performed in accordance with **IP-225**, *Determination of copper in light petroleum distillates - Specrophotometric Method*. Sensitivity: **The laboratory must have the apparatus and expertise to enable them to perform the analysis and report results in the part per billion (PPB) range.**

ATTACHMENT 3

TURBINE FUELS, AVIATION, KEROSENE TYPES, NATO F-34 (JP-8), NATO F-35, AND JP-8+100 TESTING REQUIREMENTS, MIL-DTL-83133 (LATEST VERSION)

A. Full Specification Testing (A Series), includes all tests listed below (one price for all). Testing shall be performed in accordance with the specified test method.

B. Individual tests are any one, or combination, of tests below (individual prices).

CHARACTERISTIC	TEST METHOD, ASTM
1) Workmanship	**1/**
2) Color, Saybolt **2/**	D156
3) Total Acid Number	D3242
4) Aromatics	D1319
5) Olefins	D1319
6) Sulfur, Total Percent	D129, D1266, D2622, D3120, D4294 **R/**
7) Sulfur, Mercaptan	D3227
8) Doctor Test	D4952
9) Distillation **3/**	D86 **R/,** D2887
10) Flash Point	D93 **R/,** D3828 **4/**
11) Density, or API Gravity	D1298, D4052 **R/** D1298
12) Freezing Point	D2386
13) Viscosity at -20°C	D445
14) Net Heat of Combustion, MJ/kg BTU/lb	D3338, D4809 **5/** D240 **R/**
15) Hydrogen Content	D3701 **R/,** D3343
16) Smoke Point / Naphthalenes	D1322 / D1840
17) Cetane Index, Calculated **2/**	D976 **6/**
18) Copper Strip Corrosion	D130
19) Thermal Stability	D3241 **7/**
20) Existent Gum	D381
21) Particulate Matter (Solids)	D2276 **8/**
22) Filtration Time	D2276 **8/**
23) Combined Test for Particulate Matter and Filtration Time	**12/**
24) Water Reaction, Interface Rating	D1094
25) Water Separation Index **9/**	D3948
26) Fuel Systems Icing Inhibitor	D5006 **10/**
27) Fuel Electrical Conductivity **11/**	D2624
28) Color, Visual	D4176
29) Sulfides in Water	See Statement of Work
30) Copper (CU)	IP225 **13/** (specific locations only)

C. B-1 Series Testing (one price for the following 14 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Filtration Time
11) Water Reaction
12) Water Separation Index
13) Fuel Systems Icing Inhibitor
14) Fuel Electrical Conductivity

D. B-2 Series Testing (one price for the following 17 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Filtration Time
11) Water Reaction
12) Water Separation Index
13) Fuel Systems Icing Inhibitor
14) Fuel Electrical Conductivity
15) Thermal Stability
16) Color, Saybolt
17) Total Acid Number

E. Type C Testing (one price for the following 4 tests):

CHARACTERISTIC
1) Workmanship
3) Color (Visual)
3) Density or API Gravity
4) Flash Point

NOTES:

R/ Referee Test Method

1/ Workmanship. At the time of Government acceptance, the finished fuel shall be visually free from undissolved water, sediment, or suspended matter and shall be clear and bright. In case of dispute, the fuel shall be clear and bright at 21°C (70°F) and shall contain no more than 1.0 mg/L of particulate matter as required in *table* I.

2/ To be reported - not limited.

3/ A condenser temperature of 0°C to 4°C (32°F to 40°F) shall be used for distillation by ASTM D86.

4/ ASTM D93 is the referee method, Method IP170 is also permitted. The minimum Flash Point shall be 40°C by ASTM D56, as it can be 1° to 2°C above those obtained by other methods.

5/ When the fuel distillation test is performed using ASTM D2887, the average distillation temperature, for use in ASTM D3338 shall be calculated as follows: **V = (10% + 50% + 95%)/3.**

6/ Mid-boiling temperature may be obtained by either ASTM D86 or ASTM D2887 to perform the cetane index calculation. ASTM D86 values should be corrected to standard barometric pressure.

7/ See MIL-DTL-83133, paragraph 4.5.2.1 for ASTM D3241 test conditions and test limits.

8/ A minimum sample size of 3.79 liters (one gallon) shall be filtered. Filtration time will be determined in accordance with the procedures in MIL-DTL-83133, Appendix A. This procedures may also be used for the determination of particulate matter as an alternate to ASTM D2276.

9/ A minimum water separation index rating for JP-8 shall be 85 with all additives except for the corrosion inhibitor/lubricity improver additive and the static dissipator additive, or 70 with all additives except the static dissipator additive.

10/ Test shall be performed in accordance with ASTM D5006 or method 5327 or 5340 of Fed-STD-791. Use the appropriate scale of the refractometer.

11/ The conductivity must be between 150 and 600pS/m for F-34 and between 50 and 450 pS/m for F-3 5.

12/ Filtration Time Test Procedure.

a. Membrane filters shall be removed from the package and placed in an oven for a minimum of 15 minutes to 90º C. After preheating, but prior to weighing, the membrane filters shall be stored in a desiccator.

b. Each membrane filter shall be weighed. A filter weighing in excess of 90 mg will not be used in the test.

c. The membrane filter shall be placed directly over the insert ring. The top funnel shall be locked into place.

d. Immediately prior to filtering the fuel, shake the sample to obtain a homogeneous mix and assure that fuel temperature does not exceed 30º C (86º F). Clean the exterior or top portion of the sample container to ensure that no contaminants are introduced. Any free water present in the fuel sample will invalidate the filtration time results by giving an excessive filtration time rating.

e. With the vacuum off, pour approximately 200 ml of fuel into the funnel.

f. Turn vacuum on and record starting time. Continue filtration of the 3.79 liters (1 gallon) sample, periodically shaking the sample container to maintain a homogenous mix. Record the vacuum in kPa (inches of mercury) 1 minute after start and again immediately prior to completion of filtration. Throughout filtration, maintain a sufficient quantity of fuel in the funnel so that the membrane filter is always covered.

g. Report the filtration time in minutes expressed to the nearest whole number. If filtration of the 3.79 liters (1 gallon) is not completed within 30 minutes, the test will be stopped and the volume of the fuel filtered will be measured. In these cases, report filtration time as ">30 minutes" and the total volume of fuel filtered.

h. Report the vacuum in kPa (inches of mercury) as determined from the average of the two readings taken in f.

i. After recording the filtration time, shut off the vacuum and rinse the sample container with approximately 100 ml of filtered petroleum ether and dispense into the filtration funnel. Turn the vacuum on and filter the 100 ml. Rinse. Turn vacuum off and wash the inside of the funnel with approximately 50 ml of filtered petroleum ether. Turn vacuum on and filter. Repeat the funnel rinse with another 50 ml of petroleum ether but allow the rinse to soak the filter for approximately 30 seconds before turning the vacuum on to filter the rinse. With vacuum
on, carefully remove the top funnel and rinse the periphery of the membrane filter by directing a gentle stream of petroleum ether from the solvent dispenser from the edge of the membrane toward the center, taking care not to wash contaminants off the filter. Maintain vacuum after final rinse for a few seconds to remove the excess petroleum ether from the filter.

j. Using forceps, carefully remove the membrane filter from the filter and place in a clean petri dish. Dry in the oven at 90º C (194º F) for 15 minutes with the cover on the petri dish slightly ajar. Place dish in a desiccator and allow to cool for a minimum of 15 minutes. If more than one sample is processed, cooling time will have to be increased. Reweigh the filter.

k. Report the total solids content in mg/liter by using the following formula:

$$\frac{\text{Weight gain of filter in mgs}}{3.785} = \text{mg/liter}$$

l. Should the sample exceed the 30-minute filtration time and a portion of the fuel is not filtered, the solids content in mg/liter will be filtered as follows: Determine the volume of fuel filtered by subtracting the ml of fuel remaining from 3.785.

$$\frac{\text{Weight gain of filter in mgs}}{\text{ml of fuel filtered X 0.001}} = \text{mg/liter}$$

13/ Metals: Copper will be performed in accordance with **IP-225**, *Determination of copper in light petroleum distillates - Specrophotometric Method*. Sensitivity: **The laboratory must have the apparatus and expertise to enable them to perform the analysis and report results in the part per billion (PPB) range.**

ATTACHMENT 4

AVIATION TURBINE FUEL, GRADE JET A/A1

TESTING REQUIREMENTS, ASTM D1655 (Latest Version)

A. Full Specification Testing (A Series), includes all tests listed below (one price for all). Testing shall be performed in accordance with the specified test method.

B. Individual tests are any one, or combination, of tests below (individual prices).

CHARACTERISTIC	TEST METHOD, ASTM **1/**
1) Workmanship	Section 7, ASTM D1655
2) Color, Saybolt	D156
3) Total Acid Number	D3242
4) Aromatics	D1319
5) Sulfur, Total Percent	D1266, D1552, D2622, D4294, D5453
6) Sulfur, Mercaptan	D3227
7) Distillation	D86
8) Flash Point	D56**,** D3828
9) Density, or API Gravity	D1298, D4052
10) Freezing Point	D2386, D4305 , D5901, D5972
11) Viscosity at –20^{o}C	D445
12)Net Heat of Combustion, and one of the following: Luminometer No., or Smoke Point, mm or Smoke Point/Naphthalenes	D4529, D3338, D4809, D1740. D1322, D1322, D1840
13) Hydrogen Content	D3701
14) Cetane Index, Calculated	D976
15) Copper Strip Corrosion	D130
16) Thermal Stability	D3241
17) Existent Gum	D381
18) Particulate Matter (Solids)	D2276, D5452
19) Filtration Time	**2/**
20)Combined Test for Particulate Matter and Filtration Time	**2/**
21) Water Reaction, Interface Rating	D1094
22) Microseparometer Rating	D3948
23) Fuel Systems Icing Inhibitor	D5006
24) Fuel Electrical Conductivity	D2624
25) Color, Visual	D4176
26) Sulfides in Water	See Statement of Work
27) Vapor Pressure @ 38°C, kPa	D323, D5191

C. B-1 Series Testing (one price for the following 12 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Lead content (If contaminated with leaded fuels suspected)
11) Water Reaction
12) Fuel Systems Icing Inhibitor

D. B-2 Series Testing (one price for the following 15 tests):

CHARACTERISTIC
1) Workmanship
2) Color (Visual)
3) Distillation
4) Flash Point
5) Density or API Gravity
6) Freezing Point
7) Copper Strip Corrosion
8) Existent Gum
9) Particulate Matter (Solids)
10) Lead content (If contaminated with leaded fuels suspected)
11) Water Reaction
12) Fuel Systems Icing Inhibitor
13) Thermal Stability
14) Color, Saybolt
15 Total Acid Number

E. Type C Testing (one price for the following 4 tests):

CHARACTERISTIC
1) Workmanship
4) Color (Visual)
3) Density or API Gravity
4) Flash Point

NOTES:

1/ The test methods indicated in this table are referred to in ASTM D1655, Section 10. Refer to ASTM D1655, Table I, for test limits/ranges, and additional information on testing conditions for individual characteristics.

2/ Filtration Time Test Procedure.

a. Membrane filters shall be removed from the package and placed in an oven for a minimum of 15 minutes to 90º C. After preheating, but prior to weighing, the membrane filters shall be stored in a desiccator.

b. Each membrane filter shall be weighed. A filter weighing in excess of 90 mg will not be used in the test.

c. The membrane filter shall be placed directly over the insert ring. The top funnel shall be locked into place.

d. Immediately prior to filtering the fuel, shake the sample to obtain a homogeneous mix and assure that fuel temperature does not exceed 30º C (86º F). Clean the exterior or top portion of the sample container to ensure that no contaminants are introduced. Any free water present in the fuel sample will invalidate the filtration time results by giving an excessive filtration time rating.

e. With the vacuum off, pour approximately 200 ml of fuel into the funnel.

f. Turn vacuum on and record starting time. Continue filtration of the 3.79 liters (1 gallon) sample, periodically shaking the sample container to maintain a homogenous mix. Record the vacuum in kPa (inches of mercury) 1 minute after start and again immediately prior to completion of filtration. Throughout filtration, maintain a sufficient quantity of fuel in the funnel so that the membrane filter is always covered.

g. Report the filtration time in minutes expressed to the nearest whole number. If filtration of the 3.79 liters (1 gallon) is not completed within 30 minutes, the test will be stopped and the volume of the fuel filtered will be measured. In these cases, report filtration time as “>30 minutes” and the total volume of fuel filtered.

h. Report the vacuum in kPa (inches of mercury) as determined from the average of the two readings taken in f.

i. After recording the filtration time, shut off the vacuum and rinse the sample container with approximately 100 ml of filtered petroleum ether and dispense into the filtration funnel. Turn the vacuum on and filter the 100 ml. Rinse. Turn vacuum off and wash the inside of the funnel with approximately 50 ml of filtered petroleum ether. Turn vacuum on and filter. Repeat the funnel rinse with another 50 ml of petroleum ether but allow the rinse to soak the filter for approximately 30 seconds before turning the vacuum on to filter the rinse. With vacuum on, carefully remove the top funnel and rinse the periphery of the membrane filter by directing a gentle stream of petroleum ether from the solvent dispenser from the edge of the membrane toward the center, taking care not to wash contaminants off the filter. Maintain vacuum after final rinse for a few seconds to remove the excess petroleum ether from the filter.

j. Using forceps, carefully remove the membrane filter from the filter and place in a clean petri dish. Dry in the oven at 90º C (194º F) for 15 minutes with the cover on the petri dish slightly ajar. Place dish in a desiccator and allow to cool for a minimum of 15 minutes. If more than one sample is processed, cooling time will have to be increased. Reweigh the filter.

k. Report the total solids content in mg/liter by using the following formula:

$$\frac{\text{Weight gain of filter in mgs}}{3.785} = \text{mg/liter}$$

l. Should the sample exceed the 30-minute filtration time and a portion of the fuel is not filtered, the solids content in mg/liter will be filtered as follows: Determine the volume of fuel filtered by subtracting the ml of fuel remaining from 3.785.

$$\frac{\text{Weight gain of filter in mgs}}{\text{ml of fuel filtered X } 0.001} = \text{mg/liter}$$

ATTACHMENT 5

FUEL, NAVY DISTILLATE NATO F-76

TESTING REQUIREMENTS, MIL-F-16884 (Latest Version)

A. Full Specification Testing (A Series), includes all tests listed below (one price for all). Testing will be performed in accordance with the specified method.

B. Individual tests are any one, or combination, of tests below (individual prices).

CHARACTERISTIC	TEST METHOD, ASTM,
1) Appearance	D4176 **1/**
2) Demulsification	D1401 **2/**
3) Density or API Gravity	D1298 **(R),** D4052, D287
4) Distillation	D86 **3/**
5) Cloud Point **4/**	D2500 D4359, D5771, D5772, D5773, D6371
6) Color (ASTM)	D1500
7) Flash Point	D93 **5/**
8) Particulate Contamination	D5452 **6/**
9) Pour Point	D97
10) Viscosity at 40°C	D445
11) Accelerated Storage Stability	D5304**(R),** D2274 **7/**
12) Acid Number	D974 **(R),** D664
13) Aniline Point	D611
14) Ash	D482
15) Carbon Residue (10% Bottoms)	D524 **(R),** D4530, D189 **8/**
16) Copper Strip Corrosion	D130
17) Hydrogen Content	D4808
18) Ignition Quality : Cetane Number **or** Cetane Index	D613 **(R)** D976 **9/**
19) Sulfur	D4294 **(R),** D129, D1552, D2622
20) Trace Metals	D3605 **10/**
21) Water & Sediment	D2709
22) Sulfides in Bottom Water	See Statement of Work

C. B-1 Series Testing (one price for the following 6 tests):

CHARACTERISTIC
1) Appearance
2) Density or API Gravity
3) Distillation
4) Flash Point
5) Particulate Contamination
6) Carbon Residue

D. B-2 Series Testing (one price for the following 14 tests):

CHARACTERISTIC
1) Appearance
2) Density or API Gravity
3) Distillation
4) Cloud Point
5) Flash Point
6) Particulate Contamination
7) Pour Point
8) Viscosity at 40°C
9) Accelerated Stability
10) Carbon Residue (10% Bottoms)
11) Copper Strip Corrosion
12) Cetane Index
13) Sulfur
14) Water & Sediment by centrifuge

E. Type C Testing (one price for the following 3 tests):

CHARACTERISTIC
1) Workmanship
3) Density or API Gravity
4) Flash Point

NOTES:

(R) Referee Method

1/ If sample fails D4176 because of slight haze was observed, the product must meet the requirement of ASTM D2709, 0.05%, vol., maximum. A slight haze is acceptable if the water and sediment (ASTM D2709) does not exceed 0.05%, vol. If the sample fails ASTM D4176 because it contains visible sediment or particulate matter, but meets the requirements of 10 mg/L, max., (ASTM D5452), the fuel is considered acceptable, provided all other requirements are met.

2/ The demulsification test shall be conducted in accordance with D1401, with the following exceptions:

(a) Synthetic sea water prepared in accordance with ASTM D1141 shall be used as the emulsifying fluid.

(b) The test temperature shall be 25°C.

(c) The demulsification time shall be that required for separation into two layers with no cuff at the interface. A lacy emulsion which does not form a band or cuff on the wall of the cylinder shall be disregarded. The fuel, water, and emulsion layer volumes shall be recorded at one minute intervals, and the demulsification time reported shall be to the nearest minute.

3/ As the end point of the distillation is approached, if either a thermometer reading of 385°C or a decomposition point is observed, discontinue the heating and resume the procedures as directed in ASTM D86.

4/ CLOUD POINT. Alternate test methods may be used to assess low temperature flow as detailed below:

(1) Automated Cloud Point Methods. ASTM test methods D 5771, D 5772 and D 5773 may each be used individually and without modification as substitute test methods for ASTM D 2500-98.

(2) Cold Filter Plug Point Methods. ASTM test method D 6371-99 or IP test method 309/83 may be used as a substitute for the cloud point test on the condition that the test procedure is modified as follows: start the test (apply vacuum to the test specimen for the first time) when the fuel sample temperature reaches minus 1 degree C. If the time required for 20 milliliters of fuel to be filtered through the wire mesh filter exceeds 60 seconds, record the test result as a failure. If the time required for the 20 milliliter sample to flow through the filter is 60 seconds or less, record the test result as a pass. Do not repeat application of vacuum at successively lower temperatures. This procedure represents a modification of the requirement outlined in paragraph 12.1.8 of ASTM D 6371-99 (paragraph 7.6 of IP method 309/83) that vacuum be applied to the test specimen immediately after the test jar is inserted into the cooling jacket or, at a minimum, when the fuel is at least 5 degrees C above its cloud point.

(3) Low Temperature Flow Test Method. ASTM test method D 4539-98 may be used as a substitute for the cloud point test on the condition that the following test procedure is selected: start the test (apply vacuum to the test specimen for the first time) when the fuel sample temperature reaches minus 1 degree C. This "specific test temperature" approach is called out in paragraphs 3.2 and 7.15 of ASTM D 4539-98. Criteria for determining passing and failing results shall be as specified in paragraph 7.13 of the ASTM procedure. Do not repeat application of vacuum at successively lower temperatures.

5/ The flash point value is absolute and no value less than 60°C is permissible.

6/ A one-liter, minimum, sample shall be used.

7/ ASTM D2274 may be used as an alternate method for testing storage stability provided the test time is extended from 16 hours to 40 hours.

8/ When the finished fuel contains a cetane improver, the carbon residue requirements specified in Table I of the specification shall apply to the base fuel without the cetane improver.

9/ Either cetane number (ASTM D613) or cetane index (ASTM D976) shall be reported. The cetane index requirement specified in Table I of the specification shall apply to be base fuel without cetane improving additives. Where cetane index is reported, the value shall be reported as the cetane index.

10/ Any quantitative spectroscopic method may be employed if correlation to ASTM D3605 is demonstrated to the satisfaction of the inspection authority

ATTACHMENT 6

FUEL SYSTEM ICING INHIBITOR / HIGH FLASH

TESTING REQUIREMENTS, MIL-DTL-85470 (Latest Version), NATO S-1745

A. Full Specification Testing (A Series), includes all tests listed below (one price for all). Testing shall be performed in accordance with the specified method

B. Individual tests are any one, or combination, of tests below (individual prices).

CHARACTERISTIC	TEST METHOD, ASTM
1) Workmanship	**1/**
2) Acid Number	D1613
3) Color (Platinum Cobalt)	D1209 **(R)**, E450
4) Distillation	D1078
5) Ethylene Glycol	**2/**
6) pH of 25% Solution in Water	E70 **3/**
7) Specific Gravity ($20^{o}C$ / $20^{o}C$)	D891 **(R)**, **4/**, D4052
8) Water (% Weight)	D1364 **(R)**, E1064, or E203
9) Flash Point	D93 **(R)**, D56, or D3828

c. B-1 (one price for the following 6 tests):

CHARACTERISTIC
1) Workmanship
2) Distillation
3) pH of 25% Solution in Water
4) Specific Gravity ($20^{o}C$ / $20^{o}C$)
5) Water (% Weight)
6) Flash Point

d. C Series Testing (one price for the following 4 tests):

CHARACTERISTIC
1) Workmanship
2) Specific Gravity
3) Water (%, Weight)
4) Flash Point

NOTES:

(R) Referee Test Method

1/ Workmanship. The inhibitor shall be uniform in quality, clear and bright, and free from suspended and foreign matter

2/ Ethylene glycol (percent by weight). The percent of ethylene glycol component in the diethylene glycol monomethyl ether shall be determined as below or ASTM-D4171 Annex A1 Test Method for etermining Purity of Fuel System Icing Inhibitors Using Ultra High Purity Ethylene Glycol Monomethyl Ether (anhydrous, 99.5+%) as the calibration standard for the analysis of diethylene glycol monomethyl ether.

Determination of Percent of Ethylene Glycol

Reagents and materials: Unless otherwise indicated, all reagents shall be American Chemical Society reagent grade or equivalent. Reference to water indicates distilled or deionized water.

a. Oxidizing reagents: To a solution containing 5 grams of periodic acid (HIO4) or 5.9 grams of paraperiodic acid (HIO4 ·2H2O) in 200 milliliters (ml) of water, add 800 ml of glacial acetic acid. Store the solution in a dark, well-stoppered bottle.

b. Potassium iodide: Twenty percent aqueous solution. Weigh out 20 grams of potassium iodide and dilute to 100 ml with distilled water.

c. Sodium thiosulfate, standard 0.2N: Standardize weekly or before using by an accepted procedure.

d. Starch indicator solution: One percent aqueous.

Procedure:

a. Pipette 100 ml of the oxidizing reagent into each of four 500 ml iodine flasks. Reserve two of the flasks for the blank determination.

b. Introduce 15 grams of the sample, weighed to the nearest 0.1 gram, into each of two flasks and swirl to effect solution.

c. Allow the flasks to stand for 30 minutes at room temperature.

d. While swirling, add 20 ml of 20 percent potassium iodide solution to each flask, in turn, immediately before titrating.

e. Titrate the contents of each flask to a pale yellow color with standard 0.2N sodium thiosulfate. Add 2 ml of starch indicator and titrate to the disappearance of the blue color.

f. If the net titration is more than 20 ml, repeat the determination, using a smaller sample size.

Calculations:

Calculate the concentration of ethylene glycol as:

$$\text{Weight percent ethylene glycol} = \frac{(B-A) \times N \times 3.103}{(s)}$$

Where:

A = ml of sodium thiosulfate required for the sample.

B = average ml of sodium thiosulfate required for the blank.

N = normality of sodium thiosulfate.

s = grams of sample.

3/ **pH of 25 percent solution in water**. Twenty-five ml of the inhibitor shall be pipetted into a 100 ml volumetric flask and filled with freshly boiled and cooled distilled water having a pH of 6.5 to 7.5. The pH value shall be measured with a pH meter calibrated in accordance with ASTM-E70. To avoid error caused by carbon dioxide in the air, the gas space over the solution shall be purged with carbon dioxide-free air.See footnote 2 on the following page.

4/ **See ASTM D891, Method A or B**.

ATTACHMENT 7

TESTING FOR SULFIDES IN BOTTOM WATER

(a) **SCOPE.** This method describes a procedure for determining the presence of hydrogen sulfide, which is sometimes formed as a result of bacterial action on the sulfates contained in water bottoms in fuel storage tanks.

(b) **APPARATUS.** 250 ml conical flask.

(c) **MATERIALS.**

(1) Dilute (10%) chemically pure sulfuric or hydrochloric acid.

(2) Lead acetate paper.

(d) **SAMPLES.** Representative water samples from storage tank bottoms must be taken in a glass bottle. In some cases it will be necessary to take the water sample in a Bacon bomb sampler. Samples so taken will always be transferred to a glass bottle. To preclude oxidation by air, the filled bottle must be capped immediately. The sample should be tested as soon as possible after sampling to minimize possible changes in the composition of materials in the water.

(e) **PROCEDURE.**

(1) The sample must be shaken thoroughly just prior to performing the test to make certain that any sediment present is included in the portion of the sample to be tested.

(2) Transfer 100 ml of the shaken sample into a conical flask. Add 20 ml of dilute (10%) chemically pure sulfuric or hydrochloric acid to the flask. Immediately place a piece of lead acetate paper folded in a "V" shape in the neck of the flask. Bring the water to a boil and continue to gently boil for three or four minutes.

(f) **REPORT.** The presence of sulfides in the sample will be reported if the lead acetate paper shows a black or brown discoloration.